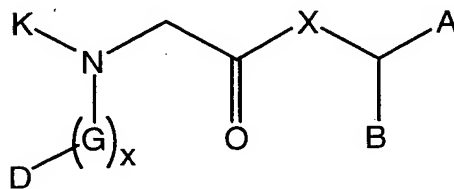


CLAIMS

1. A compound having formula (I):



(I)

and pharmaceutically acceptable derivatives thereof,
wherein:

X is O, S, C(R¹)₂ or NR¹;

10 A, B and R¹ are independently E, (C₁-C₁₀)-straight or branched alkyl, (C₂-C₁₀)-straight or branched alkenyl or alkynyl, or (C₅-C₇)-cycloalkyl or cycloalkenyl; wherein 1 or 2 hydrogen atoms in said alkyl, alkenyl or alkynyl are optionally and independently replaced with E, (C₅-C₇)-
15 cycloalkyl or cycloalkenyl; and wherein 1 to 2 methylene (-CH₂-) groups in said alkyl, alkenyl, or alkynyl groups are optionally and independently replaced by -O-, -S-, -S(O)-, -S(O)₂-, =N-, -N= or -N(R³)-;

or B and R¹ are independently hydrogen;

20 wherein R³ is selected from hydrogen, (C₁-C₄)-straight or branched alkyl, (C₃-C₄)-straight or branched alkenyl or alkynyl, or (C₁-C₄) bridging alkyl, wherein said bridge is formed between the nitrogen atom to which said R³ is bound and any carbon atom of said alkyl,
25 alkenyl or alkynyl to form a ring, and wherein said ring is optionally benzofused;

wherein E is a saturated, partially saturated or unsaturated, or aromatic monocyclic or bicyclic ring system, wherein each ring comprises 5 to 7 ring atoms

independently selected from C, N, O or S; and wherein no more than 4 ring atoms are selected from N, O or S;

wherein 1 to 4 hydrogen atoms in E are optionally and independently replaced with halogen,
5 hydroxyl, hydroxymethyl, nitro, SO₃H, trifluoromethyl, trifluoromethoxy, (C₁-C₆)-straight or branched alkyl, (C₂-C₆)-straight or branched alkenyl, O-[(C₁-C₆)-straight or branched alkyl], O-[(C₃-C₆)-straight or branched alkenyl], (CH₂)_n-N(R⁴)(R⁵), (CH₂)_n-NH(R⁴)-(CH₂)_n-Z,
10 (CH₂)_n-N(R⁴-(CH₂)_n-Z)(R⁵-(CH₂)_n-Z), (CH₂)_n-Z, O-(CH₂)_n-Z, (CH₂)_n-O-Z, S-(CH₂)_n-Z, CH=CH-Z, 1,2-methylenedioxy, C(O)OH, C(O)O-[(C₁-C₆)-straight or branched alkyl], C(O)O-(CH₂)_n-Z or C(O)-N(R⁴)(R⁵);

wherein each of R⁴ and R⁵ are independently
15 hydrogen, (C₁-C₆)-straight or branched alkyl, (C₃-C₅)-straight or branched alkenyl, or wherein R⁴ and R⁵, when bound to the same nitrogen atom, are taken together with the nitrogen atom to form a 5 or 6 membered ring, wherein said ring optionally contains 1 to 3 additional
20 heteroatoms independently selected from N, O or S; wherein said alkyl, alkenyl or alkynyl groups in R₄ and R₅ are optionally substituted with Z.

each n is independently 0 to 4;

each Z is independently selected from a saturated,
25 partially saturated or unsaturated, monocyclic or bicyclic ring system, wherein each ring comprises 5 to 7 ring atoms independently selected from C, N, O or S; and wherein no more than 4 ring atoms are selected from N, O or S;

30 wherein 1 to 4 hydrogen atoms in Z are optionally and independently replaced with halo, hydroxy, nitro, cyano, C(O)OH, (C₁-C₃)-straight or branched alkyl,

O-(C₁-C₃)-straight or branched alkyl,
C(O)O-[(C₁-C₃)-straight or branched alkyl], amino,
NH[(C₁-C₃)-straight or branched alkyl], or
N-[(C₁-C₃)-straight or branched alkyl]₂;

5 K is selected from E, (C₁-C₆)-straight or branched alkyl, (C₂-C₆)-straight or branched alkenyl or alkynyl, wherein 1 to 2 hydrogen atoms in said alkyl, alkenyl or alkynyl is optionally and independently replaced with E;

wherein K is optionally substituted with up to 3
10 substituents selected from halogen, OH, O-(C₁-C₆)-alkyl, O-(CH₂)_n-Z, NO₂, CO₂H, C(O)-O-(C₁-C₆)-alkyl, C(O)NR⁴R⁵, NR⁴R⁵ and (CH₂)_n-Z; or,

G, when present, is -S(O)₂-, -C(O)-, -S(O)₂-Y-,
-C(O)-Y-, -C(O)-C(O)-, or -C(O)-C(O)-Y-;

15 Y is oxygen, or N(R⁶);

wherein R⁶ is hydrogen, E, (C₁-C₆)-straight or branched alkyl, (C₃-C₆)-straight or branched alkenyl or alkynyl; or wherein R⁶ and D are taken together with the atoms to which they are bound to form a 5 to 7 membered
20 ring system wherein said ring optionally contains 1 to 3 additional heteroatoms independently selected from O, S, N, NH, SO, or SO₂; and wherein said ring is optionally benzofused;

D is hydrogen, (C₁-C₇)-straight or branched
25 alkyl, (C₂-C₇)-straight or branched alkenyl or alkynyl, (C₅-C₇)-cycloalkyl or cycloalkenyl optionally substituted with (C₁-C₆)-straight or branched alkyl or (C₂-C₇)-straight or branched alkenyl or alkynyl, [(C₁-C₇)-alkyl]-E, [(C₂-C₇)-alkenyl or alkynyl]-E, or E;

30 wherein 1 to 2 of the CH₂ groups of said alkyl, alkenyl or alkynyl chains in D is optionally replaced by -O-, -S-, -S(O)-, -S(O₂)-, or -N(R³);

provided that when G is selected from $-S(O)_2-$,
 $-C(O)C(O)-$, $-SO_2-Y$, or $-C(O)-Y$, or $-C(O)C(O)-Y$,
wherein $Y = O$; then D is not hydrogen; and
 $x = 0$ or 1 .

5

2. The compound according to claim 1,
wherein:

each of A and B is independently selected from
 $-CH_2-CH_2-E$ or $-CH_2-CH_2-CH_2-E$; and

10

E is a monocyclic or bicyclic aromatic ring system,
wherein said ring comprises 5-7 ring atoms independently
selected from C, N, O or S, and wherein 1 to 4 ring atoms
are independently selected from N, O or S;

wherein 1 to 4 hydrogen atoms in E are optionally
15 and independently replaced with halogen, hydroxyl,
hydroxymethyl, nitro, SO_3H , trifluoromethyl,
trifluoromethoxy, (C_1-C_6) -straight or branched alkyl,
 (C_2-C_6) -straight or branched alkenyl, $O-[(C_1-C_6)$ -straight
or branched alkyl], $O-[(C_3-C_6)$ -straight or branched
20 alkenyl], $(CH_2)_n-N(R^4)(R^5)$, $(CH_2)_n-NH(R^4)-(CH_2)_n-Z$,
 $(CH_2)_n-N(R^4-(CH_2)_n-Z)(R^5-(CH_2)_n-Z)$, $(CH_2)_n-Z$, $O-(CH_2)_n-Z$,
 $(CH_2)_n-O-Z$, $S-(CH_2)_n-Z$, $CH=CH-Z$, 1,2-methylenedioxy,
 $C(O)OH$, or $C(O)-N(R^4)(R^5)$.

25

3. The compound according to claim 1 or 2,
wherein D is an aromatic monocyclic or bicyclic ring
system, wherein each ring comprises 5 to 7 ring atoms
independently selected from C, N, O or S; and wherein no
more than 4 ring atoms are selected from N, O or S.

30

4. The compound according to claim 3, wherein
D is substituted phenyl.

5. The compound according to claim 4, wherein
G is $-C(O)C(O)-$.

5 6. The compound according to claim 4, wherein
G is $-SO_2-$.

7. The compound according to claim 4, wherein
G is $-C(O)-$.

10 8. The compound according to claim 4, wherein
G is $-C(O)Y-$.

9. A compound selected from compound nos. 1
15 and 2.

10. The compound according to claim 2, wherein
each of A and B is independently selected from $-CH_2-CH_2-E$
or $-CH_2-CH_2-CH_2-E$; and
20 E is pyridyl.

11. A composition comprising a compound
according to claim 1 and a pharmaceutically effective
carrier.

25 12. The composition according to claim 12,
further comprising a neurotrophic factor.

13. The composition according to claim 13,
30 wherein said neurotrophic factor is selected from nerve
growth factor (NGF), insulin-like growth factor (IGF-1)
and its active truncated derivatives such as gIGF-1 and

Des(1-3)IGF-I, acidic and basic fibroblast growth factor (aFGF and bFGF, respectively), platelet-derived growth factors (PDGF), brain-derived neurotrophic factor (BDNF), ciliary neurotrophic factors (CNTF), glial cell line-
5 derived neurotrophic factor (GDNF), neurotrophin-3 (NT-3) and neurotrophin 4/5 (NT-4/5).

14 15. The composition according to claim 14,
wherein said neurotrophic factor is nerve growth factor
10 (NGF).

15 16. A method for stimulating neuronal
regeneration in a patient or in an ex vivo nerve cell,
comprising the step of administering to said patient or
15 said nerve cell a compound according to any one of claims
1-12.

16 17. The method according to claim 16, wherein
said compound is administered to a patient and is
20 formulated together with a pharmaceutically suitable
carrier into a pharmaceutically acceptable composition.

17 18. The method according to claim 17,
comprising the additional step of administering to said
25 patient a neurotrophic factor either as part of a
multiple dosage form together with said compound or as a
separate dosage form.

18 19. The method according to claim 18, wherein
30 said neurotrophic factor is selected from nerve growth
factor (NGF), insulin-like growth factor (IGF-1) and its
active truncated derivatives such as gIGF-1 and

Des(1-3)IGF-I, acidic and basic fibroblast growth factor (aFGF and bFGF, respectively), platelet-derived growth factors (PDGF), brain-derived neurotrophic factor (BDNF), ciliary neurotrophic factors (CNTF), glial cell line-
5 derived neurotrophic factor (GDNF), neurotrophin-3 (NT-3) and neurotrophin 4/5 (NT-4/5).

19 20. The method according to claim 19, wherein said neurotrophic factor is nerve growth factor (NGF).

10 20 21. The method according to claim 16, wherein said method is used to treat a patient suffering from a disease selected from trigeminal neuralgia, glossopharyngeal neuralgia, Bell's Palsy, myasthenia
15 gravis, muscular dystrophy, muscle injury, progressive muscular atrophy, progressive bulbar inherited muscular atrophy, herniated, ruptured, or prolapsed intervertebrae disk syndrome's, cervical spondylosis, plexus disorders, thoracic outlet destruction syndromes, peripheral
20 neuropathies, such as those caused by lead, dapsone, ticks, or porphyria, other peripheral myelin disorders, Alzheimer's disease, Gullain-Barre syndrome, Parkinson's disease and other Parkinsonian disorders, ALS, Tourette's syndrome, multiple sclerosis, other central myelin
25 disorders, stroke and ischemia associated with stroke, neural paropathy, other neural degenerative diseases, motor neuron diseases, sciatic crush, neuropathy associated with diabetes, spinal cord injuries, facial nerve crush and other trauma, chemotherapy- and other
30 medication-induced neuropathies, and Huntington's disease.

21 22. The method according to claim 16,
wherein said method is used to stimulate neuronal
regeneration in an ex vivo nerve cell.

5 22 23. The method according to claim 22,
comprising the additional step of contacting said ex
vivo nerve cell with a neurotrophic factor.

23 24. The method according to claim 23, wherein
10 said neurotrophic factor is selected from nerve growth
factor (NGF), insulin-like growth factor (IGF-1) and its
active truncated derivatives such as gIGF-1 and
Des(1-3)IGF-I, acidic and basic fibroblast growth factor
(aFGF and bFGF, respectively), platelet-derived growth
15 factors (PDGF), brain-derived neurotrophic factor (BDNF),
ciliary neurotrophic factors (CNTF), glial cell line-
derived neurotrophic factor (GDNF), neurotrophin-3 (NT-
3) and neurotrophin 4/5 (NT-4/5).

20 24 25. The method according to claim 24, wherein
said neurotrophic factor is nerve growth factor (NGF).